



INVASIVE WEEDS FACT SHEET

Tree-of-Heaven

(*Ailanthus altissima*)

Background

Tree-of-heaven, commonly referred to as ailanthus, is a rapidly growing deciduous tree native to a region extending from China south to Australia. It was first introduced into the United States in the Philadelphia area in 1784. Immigrants later introduced tree-of-heaven to the West Coast in the 1850s. It was initially valued as an urban street tree and was widely planted in the Baltimore and Washington, D.C., area. From these areas, tree-of-heaven has spread and become a common invasive plant in urban, agricultural, and forested areas.

Description

Size: Tree-of-heaven has rapid growth and can grow into a very large tree, reaching heights of 80 to 100 feet and up to 6 feet in diameter.

Bark: The bark of tree-of-heaven is smooth and green when young, eventually turning light brown to gray, resembling the skin of a cantaloupe.

Leaves: Tree-of-heaven leaves are pinnately compound, meaning they have a central stem in which leaflets are attached on each

side. One leaf can range in length from 1 to 4 feet with anywhere from 10 to 40 leaflets. The leaflets are “lance” shaped with smooth or “entire” margins. At the base of each leaflet are one to two protruding bumps called glandular teeth. When crushed, the leaves and all plant parts give off a strong, offensive odor.

Twigs: The twigs of tree-of-heaven are alternate on the tree, stout, greenish to brown in color, and lack a terminal bud. They have large V- or heart-shaped leaf scars. The twigs easily break to expose the large, spongy, brown center, or pith.

Seeds: Seeds on female trees are a 1-to-2-inch-long twisted samara, or wing. There is one seed per samara. The samaras are found in clusters, which often hang on the tree through winter.

Dispersal

Tree-of-heaven is dioecious, meaning a tree is either male or female, and typically grows in dense colonies, or “clones.” All trees in a single clone are the same sex. Female trees are prolific seeders with the potential to produce more than 300,000 seeds annually. The single-seeded samaras are wind dispersed. Established trees continually spread by sending up root suckers that may emerge as far as 50 feet from the parent tree. A cut



A Dave Jackson



B Matt Yancey



C Eric Burkhardt



D Dave Jackson



E Dave Jackson



F Dave Jackson

- A. Bark
- B. Leaf
- C. Leaf margin
- D. Brown spongy pith
- E. Leaf scar
- F. Seeds (samaras)

or injured ailanthus tree may send up dozens of root sprouts. Sprouts as young as two years are capable of producing seed. Tree-of-heaven produces allelopathic chemicals in its leaves, roots, and bark that can limit or prevent the establishment of other plants.

Site

Tree-of-heaven grows almost anywhere, from mine spoil in full sun to fertile, partly shaded, alluvial soils along rivers and streams. Besides urban areas, tree-of-heaven is now found growing along woodland edges, roadsides, railways, fencerows, and in forest openings. Tree-of-heaven is intolerant of shade and cannot compete under a closed forest canopy but will quickly colonize disturbed areas, taking advantage of forests defoliated by insects or impacted by wind and other disturbances.

Look-alikes

This species is easily confused with some of our native species that have compound leaves and numerous leaflets, such as staghorn sumac, black walnut, and hickory. The leaf edges of these native trees all have teeth, called serrations, while those of tree-of-heaven are smooth. The foul odor produced by the crushed foliage and broken twigs is also unique to tree-of-heaven.

Control

Due to its extensive root system and resprouting ability, tree-of-heaven is difficult to control. Treatment timing and following up the second year are critical to success. Mechanical methods, such as cutting or mowing, are ineffective, as the

tree responds by producing large numbers of stump sprouts and root suckers. When cutting tree-of-heaven is necessary to remove potentially hazardous trees, it is best to treat with an herbicide first, allow 30 days for it to take effect, and then cut.

Hand pulling young seedlings is effective when the soil is moist and the entire root system is removed. Small root fragments are capable of generating new shoots. Seedlings can be easily confused with root suckers, which are nearly impossible to pull by hand.

To control tree-of-heaven, target the roots with systemic herbicides applied in mid- to late summer (July to September) when the tree is moving carbohydrates to the roots. Herbicide applications made outside this late growing season window will only injure aboveground growth. Following treatment, repeated site monitoring for signs of regrowth is critical to prevent reinfestation.

Herbicides applied to foliage, bark, or frill cuts on the stem are effective at controlling tree-of-heaven. Cut stump herbicide applications encourage root suckering and should not be utilized. Apply all treatments no earlier than July 1 up until the tree begins to show fall colors. There are many effective herbicides available for use on tree-of-heaven, including dicamba, glyphosate, imazapyr, metsulfuron methyl, and triclopyr. For most treatments we recommend using herbicides containing the active ingredients glyphosate or triclopyr.

Foliar herbicide sprays are used where tree height and distribution allow effective coverage without unacceptable contact with nearby desirable plants. Treatments are applied in mid- to late growing season with equipment ranging from high-volume truck-mounted sprayers to low-volume backpack sprayers.

For dense or extensive infestations, treat initially with a foliar application to eliminate the small, low growth. Then follow up with a bark or frill application on the remaining larger stems. The initial foliar application will control most of the stems, while the follow-up stem treatment controls missed stems or those too tall for adequate coverage.

Basal bark applications provide a target-specific method for treating tree-of-heaven that in general is less than 6 inches in diameter. Using a low-volume backpack sprayer, a concentrated mixture of herbicide containing the ester formulation of triclopyr in oil is applied from the ground line to a height of 12 to 18 inches, completely around the stem. To maximize translocation to the roots, apply herbicides from mid- to late summer.

Frill herbicide applications, called hack-and-squirt, are highly selective with a concentrated herbicide solution applied directly into the stem. For effective hack-and-squirt applications, apply the herbicide solution to spaced cuts around the circumference of the stem. Leaving uncut living tissue between the frill cuts allows the herbicide to move to the roots. Again, make applications in mid- to late summer.

Well-established tree-of-heaven stands are only eliminated through repeated efforts and monitoring. Initial treatments often only reduce the root systems, making follow-up measures necessary. Persistence is the key to success.

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